What is claimed is:

1. A substrate processing chamber component comprising a structure having an integral surface coating of an yttrium-aluminum compound.

2. A component according to claim 1 wherein the integral surface coating comprises an anodized coating.

3. A component according to claim 2 wherein the structure comprises a metal alloy of yttrium and aluminum.

4. A component according to claim 3 wherein the metal alloy comprises an yttrium content of less than about 50% by weight.

5. A component according to claim 1 wherein the integral surface coating comprises an ion implanted coating.

6. A component according to claim 1 wherein the yttrium-aluminum compound comprises yttrium aluminum oxide.

7. A component according to claim 6 wherein the yttrium-aluminum compound comprises YAG.

8. A component according to claim 1 wherein the integral surface coating comprises a thickness of from about 0.5 mils to about 8 mils.

9. A component according to claim 1 wherein the underlying structure is an enclosure wall.

10. A component according to claim 1 wherein the underlying structure is a wall liner.

11. A method of manufacturing a substrate processing chamber component comprising:

(a) forming a chamber component comprising a structure comprising a metal alloy composed of yttrium and aluminum; and

(b) anodizing a surface of the metal alloy structure to form an anodized coating of an yttrium-aluminum compound.

12. A method according to claim 11 comprising anodizing the surface of the metal alloy to form yttrium aluminum oxide.

13. A method according to claim 11 wherein (a) comprises forming a metal alloy comprising an yttrium content of less than about 50% by weight.

14. A method according to claim 11 comprising anodizing the surface of the metal alloy structure to form an anodized coating having a thickness of from about 0.5 mil to about 8 mils.

15. A method according to claim 11 comprising anodizing the surface of the metal alloy in an acidic solution comprising one or more of oxalic acid, chromic acid and sulfuric acid.

16. A method according to claim 15 comprising anodizing the surface of the metal alloy for from about 30 minutes to about 120 minutes.

17. A method according to claim 11 comprising anodizing the surface of the metal alloy to form an anodized coating comprising YAG.

18. A method of manufacturing a substrate processing chamber component comprising:

(a) forming a chamber component comprising a structure comprising aluminum; and

(b) ion implanting yttrium into the aluminum.

19. A method according to claim 18 wherein (b) comprises generating yttrium ions and energizing the ions to energy levels of from about 50

to about 500 keV.

20. A method according to claim 18 further comprising annealing the structure.

21. A method according to claim 18 further comprising ion implanting oxygen into the structure.

22. A method according to claim 18 comprising anodizing the surface of the structure in an acidic solution.

23. A method according to claim 18 comprising treating the surface of the structure to form yttrium aluminum oxide.

24. A method according to claim 18 comprising treating the surface of the structure to form YAG.

25. A method of manufacturing a substrate processing chamber component comprising:

(a) shaping a chamber component comprising a structure comprising aluminum;

(b) ion implanting yttrium in the structure; and

(c) ion implanting oxygen in the structure.

26. A method according to claim 25 wherein (b) comprises generating yttrium ions and energizing the ions to energy levels of from about 50 to about 500 keV.

27. A method according to claim 25 further comprising annealing the structure.

28. A method according to claim 25 comprising implanting yttrium and oxygen to provide a molar ratio of yttrium to aluminum to oxygen that forms YAG.

29. A substrate processing apparatus comprising:

a process chamber having a wall about a process zone;

a substrate transport capable of transporting a substrate into the process chamber;

a substrate support capable of receiving a substrate;

a gas supply capable of introducing a process gas into the process chamber;

a gas energizer capable of energizing the process gas in the process chamber; and

an exhaust capable of exhausting the process gas from the process chamber,

wherein one or more of the process chamber wall, substrate support, substrate transport, gas supply, gas energizer and gas exhaust, comprises a structure having an integral surface coating of an yttrium-aluminum compound.

30. An apparatus according to claim 29 wherein the integral surface coating comprises an anodized coating.

31. An apparatus according to claim 29 wherein the structure comprises a metal alloy of yttrium and aluminum.

32. An apparatus according to claim 31 wherein the metal alloy comprises an yttrium content of less than about 50% by weight.

33. An apparatus according to claim 29 wherein the integral surface coating comprises an ion implanted coating.

34. An apparatus according to claim 29 wherein the yttrium-aluminum compound comprises yttrium aluminum oxide.

35. An apparatus according to claim 29 wherein the yttrium-aluminum compound comprises YAG.